IV.—*Descriptive Catalogue of Terrestrial and Fluviatile Testacea, chiefly from the North-East Frontier of Bengal. By* W. H. BENSON, *Esq. B. C. S.*

The species of land and fresh-water shells described in the following pages, form a collection, chiefly made in the hills on the N. E. frontier, which was purchased by the Asiatic Society of Bengal in 1833. One of the land shells, *Scarabus triangularis*, and two *Neritinæ* and a *Melania* among the fluviatile shells, inhabit the jungles and streams of the Gangetic Delta, and were probably collected on the route to Sylhet. Several shells belonging to the genera *Cerithium, Cancellaria, Planaxis, Phasianella,* and *Pedipes,* which occur in the collection, have been omitted, as being, in all probability, marine, or semi-marine productions procured from the embouchures of the Deltaic rivers.

1. *Vitrina Gigas.* Testâ tenui, corneo-virente, ovato-depressâ, auriformi, velociter crescente, suprà planatâ, rugis concentricis et striis radiatis decussatâ; subtus tumidâ; ultimo anfractu valde ventricoso, penè totam testam efformante; aperturâ transversâ, rotundato ovatâ, prægrandi; labio valdè arcuato. Diam. 1.15 poll.

This shell is so flattened, and enlarges so quickly, that it has very much of the appearance of one of the *macrostomata,* to which I referred a specimen from the caves of Sylhet, recently fossilized with calc-tuff, when I first saw it. It has only two whorls exclusive of the apex, and differs in size, in the depression of the spire, in the very arcuated left lip, and the more extended mouth from the European species *V. elongata.* I believe that it is the first shell truly belonging to this genus which has been ascertained to inhabit India. Since I became acquainted with it, I have met with a second species alive, adhering to dead leaves at the roots, and to the lower part of the trunks of trees in the teak-wood attached to the Botanic Garden of Calcutta; but the characters of the animal restrict it to the genus *Helicarion* of CUVIER. Whether *V. Gigas* belongs to CUVIER's *Helicolimax* or to *Helicarion,* cannot be ascertained without an examination of the animal; I therefore leave it in the original genus as defined by LAMARCK.

2. *Nanina decussata.* Testâ corneâ, discordeâ, sub-depressâ, umbilicatâ; spirâ exsertiusculâ, obtusâ; anfractibus septem suprà planatis, ultimo obtusè angulato; epidermide suprà argutè decussatâ, infrà radiatim striatâ; apertura transversâ, lunatâ. Diam. 1 poll; axis 0.35

On a cursory inspection of this shell, I erroneously considered it to be a variety of the species "*vitrinoides*" DESHAYES, belonging to Mr. GRAY's genus *Nanina,* (Zool. Proceedings, 8th July, 1834,) which I indicated under the name of *Macrochlamys* in the first No. of the Jour-

nal of the Asiatic Society for January 1832, pp. 13 and 76, and which I altered to that of *Tanychlamys* in a paper on the genus read before the Zoological Society in August 1834. Mr. Gray's characters, drawn up from specimens preserved in spirits, and from General Hardwicke's drawings, having the advantage of priority of publication, his name, although inexpressive, will necessarily be adopted. Several independent observers have united in stating the necessity of separating this genus from *Helix*, on the characters of the animal; witness the observations of Lieut. Hutton, Journal of the Asiatic Society, vol. iii. p. 83.

The species under review differs from *N. vitrinoides* in sculpture, has a more exserted spire than the generality of specimens of that shell, has a more angular periphery, is of a lighter colour, and, possessing the same number of whorls, is larger and of a thicker substance. The epidermis is apt to peel off the under side.

I have a third species belonging to this country, which I lately took at the foot of the Rajmahal hills. It differs in its smaller size, its lighter colour, and in the form of the aperture from both *vitrinoides* and *decussata*, and from the former it altogether differs in its habits even when inhabiting the same spot, abounding on shrubs and bushes, while *N. vitrinoides* is confined to the ground, to rocks, and to brick work.

3. *Helix plectostoma.* Testâ reversâ, depresso-conoideâ subtùs tumidâ; spirâ exsertiusculâ; anfractibus suprà planatis, radiatim plicatis, rugis transversis decussatis; ultimo angulato, angulo subtùs marginato. Aperturâ lunatâ, plicâ, (ut in Helice personata) interdum inconspicuâ, ultimo anfractui adhærente; umbilico profundo, anfractus plerosque exhibenti. Diam. 0.35 poll. paulo plus.

This shell has a salient plate on the penultimate whorl connecting the two extremities of the peristome, as in *H. personata*, but differs from it in its other characters. The peristome is more rounded than in *H. Cocyrensis*, the spire more conoid, and the satures less conspicuous. It belongs to the subgenus *Helicodonta* of De Ferussac, but in the angularity of the periphery it approaches to *Helicigona*.

4. *Helix Oxytes.* Testâ ferrugineo-corneâ, depressâ; spirâ convexâ, apice planato; periphæriâ acutâ; anfractibus obliquè subplicatis, suturis non excavatis; peristomate subreflexo; umbilico lato et profundo anfractus usque ad apicem exhibenti. Diam. 1.8 poll.

In form it exactly resembles *H. acumen* of Dalmatia, but exceeds it in size, and differs in colour, in its sub-reflected mouth, and in sculpture, the whorls being destitute of decussating striæ and of the polish which adorns the latter. It belongs to De Ferussac's groupe

of *Helicigona*, and to the 2nd division, *Vortices*. It would stand as a *Carocolla* of LAMARCK. Whorls six, exclusive of the apex.

5. *Helix climacterica*. Testâ subdepressâ, subtùs tumidâ; spirâ sub-conoidea, gradatâ; anfractibus omnibus angulatis, suprà planatis, argutè plicatis; apice obtuso. Periphæriâ angulatâ. Peristomate acuto, non reflexo. Umbilico nullo. Diam. 0.75 poll.

This species resembles *H. barbata* of Cephalonia in its general habit and in the peculiar form of its spire, which rises like a flight of steps; but the apex, though obtuse, is more exserted, and is destitute of the flattening observable in the Cephalonian species. Whorls eight, exclusive of the apex. It belongs to *Helicigona* of DE FERUSSAC, and to its first groupe, which is destitute of an umbilicus.

6. *Helix Serrula*. Testâ subdepressâ, sub-conoideâ subtus convexâ; apice acuto; anfractibus suprà confertissimè radiatim plicatis, marginatis, marginibus elevatis; ultimo anfractu infrà læviore, periphæria marginatâ, serratâ. Umbilico profundo, mediocri; peristomate acuto. Diam. 0.55 poll.

Whorls seven, exclusive of the apex. This is also a *Helicigona*, 2nd groupe. It is allied to a new unnamed species which I have from Malta, but has a smaller umbilicus in proportion, and a more acute spire. It is also larger.

7. *Helix tapeina*. Testâ sub-conoideâ, suprà convexâ, subtùs tumidâ; epidermide minutissimè corrugatâ; periphæriâ angulatâ, peristomate non continuo, subreflexo. Umbilico mediocri, profundo; omnes anfractus exhibente. Diam. 0.6 poll.

Whorls seven, exclusive of the apex. It is allied to *Carocolla Lapicida*, but differs in sculpture, in its discontinuous peristome, less angular periphery, and more conoid spire. The aperture is also more open. It belongs to the 2nd groupe of *Helicigona* of DE FERUSSAC, and to the genus *Carocolla* of LAMARCK.

8. *Helix delibratus*. Testâ depresso-planâ, subtùs tumidâ; epidermide corneâ deciduâ; anfractibus transversè striatis; aperturâ transversè rotundato-ovatâ; peritremate vix continuo, reflexo; umbilico lato, anfractus plerosque exhibente. Diam. 0.9 poll.

Whorls four. Of the same type as the European species *H. cornea*, from which it differs in colouring and in the form of its spire, which resembles that of *H. deplana* of Croatia; but from this species it differs in the form of the mouth, and in the markings, as well as in its more open umbilicus. From *Helix granulata* (mihi) of the Western Provinces, it differs in the more transverse mouth, more flattened spire, and wider umbilicus, in its plainer colouring and greater size, and in the want of that minute shagreened appearance, under the lens, which

renders that species so remarkable. It belongs to the subgenus *Helicella* of De Ferussac. The epidermis scales off like that of the *Solenes*, whence the trivial name which I have conferred upon it.

9. *Helix Cestus.* Testâ subdepressâ, corneâ vel fuscescente, radiatim striatâ, subtus convexâ, perforatâ; spirâ sub-conoideâ; apice obtuso; ultimo anfractu sub-angulato, fasciâ unicâ rufo-fuscâ, mediâ, reliquis fasciâ saturali cinctis; peristomate sub-reflexo. Diam. 0.65 poll.

Whorls five. *H. cestus* approaches in form and colour to a species which I possess from the Tyrol, and which is marked "*H. zonata*," but which does not agree well with Lamarck's characters of *planospira*, of which he gives De Ferussac's *zonata* as a synonym. It differs from it in not having a white or a much reflected peristome. It belongs to the sub-genus *Helicella*.

10. *Bulimus citrinus.* Lamarck.

This is the reverse variety of a handsome shell, of which South America is recorded as the habitat by Lamarck. It is perforated, (of which character he makes no mention,) and of an uniform yellow, without bands or marks, and being weathered, no polish is observable. Length one inch.

11. *Achatina tenuispira.* Testâ elongato turritâ, corneâ, longitudinaliter striatâ, versus apicem attenuatâ, columnari; anfractu ultimo interdum fasciis quibusdam albidis transversis ornato; suturis impressis; apice obtuso. Long. 1 poll. circiter. Lat. 0.55.

This *Achatina*, belonging to De Ferussac's subgenus *Cochlicopa* and to his groupe of *Hyloides*, is remarkable for the attenuated columnar form of the terminal whorls of the spire.

12. *Achatina crassilabris.* Testâ turrito conicâ, lævi, corneâ, longitudinaliter striatâ; anfractibus convexis, suturis excavatis; labro intùs incrassato; columellâ præarcuatâ; apice obtuso. Long. 0.7. Lat. 0.3 poll.

This shell has the habit of a Ceylon species which I believe to be *A. nitens* of Gray. It differs in greater size, in its incrassated outer lip, in its somewhat more ventricose form, and in its sculpture. It approaches to Swainson's genus *Achatinella* in the arcuation of the columella, but differs in the absence of the thickened pliciform termination to it, and in having the incrassation quite at the edge of the outer lip, instead of removed to a little distance within it.

13. *Clausilia loxostoma.* Testâ sinistrorsâ, fusiformi, medio ventricosâ, corneo-grisescente; anfractibus convexis, lævigatis, striis obsoletis; suturis confortissimè crenulatis; aperturâ elongatâ obliquâ, bi-plicatâ, suprà angustiori, infrà dilatatâ peristomate reflexo; columellâ præarcuatâ. Long. 0.85 poll.

Out of a collection of 32 European *Clausiliæ*, I find none with a similar obliquity of mouth, from which character I have named the species. The outer lip projects beyond the plane of the aperture. The crenulations of the sutures differ altogether from the papillary appearance which is common to several species, such as *papillaris, alboguttata*, &c., and they are not elongated as in *C. nitida*.

14. *Scarabus triangularis*. Testâ compressâ ovato-conica, ætate subtriangulari, cornea, fasciis castaneis plurimis interdum obsoletis cinctâ, rugis longitudinalibus salcisque transversis, distantibus, interruptis decussata. Spirâ acutâ breviori; suturis obsoletis. Anfractûs ultimi varice saliente lamelliformi. Aperturâ quadridentata, biplicata; dentibus, uno insuper columellarium, tribus super costulam introlabialem sitis; plicâ unâ columellarii duplici, pandatâ, alterâ columellæ recurvâ, parvâ. Umbilico lineari, transversali, penè clauso. Length 0.9. Breadth 0.65 inch.

This shell, independently of its form, sculpture, colouring, and acute varix, may be at once distinguished from *Scarabus imbrium* by its peculiar umbilicus; that feature being rounded and perforate in the Malassan species. The number of teeth on the rib, which is situated at some distance within the outer lip, is very variable, ranging from three to seven; of these three are always more prominent. In weathered specimens the subordinate denticulations are generally unobservable. Occasionally the whole of the shell is of a dark chestnut colour, with obscure bands of a more saturated colour. In his Synoptical table, DE FERUSSAC mentions two species from Bengal, *S. plicatus* and *S. Petiveri*, both distinct from *S. imbrium*. As he gives no description, I am unable to say whether our shell is identical with either or both: the latter contingency may possibly be the case, considering the great difference of form observable between young and aged specimens, and the uncertainty attendant on the species *S. Petiveri*, which appears to have been established solely on the inspection of a plate, no reference being made to any museum.

All the specimens of the shell in the collection are weathered, and in that state appear of a livid purple colour; this circumstance was, however, amply compensated for by an excursion which I made with Dr. PEARSON to the alluvial island opposite to Fort William, in quest of objects of natural history, during which that gentleman discovered the live animal under decayed vegetation, and under bundles of the *hoogla* grass cut down for sale. From these retreats, which it occupied in company with the amphibious *Assiminia Gangetica*, we made a large collection in a short space of time. I have searched for it in vain on the neighbouring mainland, in the vicinity of the Bishop's

College and the Botanic Gardens, as well as on the opposite side of the river; but specimens of deserted shells were taken by a friend, as low down as the junction of the Damoda with the Hooghly.

It is only of late that French naturalists have verified the terrestrial habits of the genus. The present species is much distressed when thrown into water, and crawls out of it when immersed. Its decidedly amphibious companion, *Assiminia Gangetica*, I have met with, on dewy mornings, more than a furlong from the river's bank, crawling among moist grass.

15. *Cyclostoma involvulus.* (Muller.)

This elegant species, which is abundant in a living state at Rajmahal, Secrigally, and Patharghâta in Behar, attains a large size in the Silhet collection. When adult it is always possessed of a beautiful orange colour on the peristome. It is *Cyclostoma torquata* of Lieut. Hutton, J. A. S. vol. iii. page 82, and is the species alluded to by me in vol. i. page 12, in my remarks on the genus *Pterocyclos*.

16. *Cyclostoma zebrinum.* Testâ albidâ, strigis plurimis rufo-custaneis, angulato-flexuosis pictâ, spirâ depressiusculâ, acuminatâ; anfractibus plicis paucis transversalibus distantibus, ultimo rugis undulatis longitudinalibus sculptis; carina mediâ subacutâ. Aperturâ amplâ, peritremate reflexo; umbilico parvo. Epidermide crassâ, fuscâ, plicis longitudinalibus, his setis fortibus munitis, instructis. Diam. 10.35 poll.

I was at first disposed, from a consideration of the habit of this shell, to view it as a variety of a Tenasserim shell, described by Mr. G. B. Sowerby in the 5th volume of the Zoological Journal under the name of *Cyclostoma perdix;* but a careful comparison with specimens which Mr. Sowerby had kindly presented to me, has enabled me to distinguish it as a separate species. It differs in its sculpture, in its more developed keel, more contracted umbilical cavity, and in the possession of a singular epidermis, of which Mr. Sowerby's specimens of *C. perdix*, though one was taken alive at Tenasserim, appear to have been destitute. In the latter species the markings are white mottled on a chestnut ground; in *zebrinum* they consist of distant zigzag flames of light chestnut on a white ground.

17. *Pterocyclos hispidus.* Spiraculum hispidum, Pearson, Journal of the Asiatic Society, vol. ii. p. 391.

The acquisition of several live specimens of this genus (established by me in the first No. of the Journal) during the last rainy season, at the hill of Patharghata in Behar, where I first met with dead specimens of *P. rupestris*, enables me to disprove the conjecture of Dr. Pearson that a branchial apparatus or projecting syphon is attached

to the neck of the animal, as well as to confirm its affinity with the genus *Cyclostoma*, with which Mr. SOWERBY has classed it. The name originally annexed to the genus was altered by Dr. PEARSON, on insufficient grounds, as, independently of the violation of received rules of nomenclature*, of the existence of the tabular appendage in perfection in only one species of the genus, and its non-existence in others, the new name tended to convey an erroneous impression of the use of the anomalous excrescence observable in the shell of *P. hispidus*.

Dr. PEARSON assumes that the specimens of *P. rupestris* from which the characters of the genus were taken, were immature shells, but a strict search in the habitat of the species, and the acquisition of 16 specimens of different ages and growth, of which 12 bore all the marks of being adult, dispelled all doubt of the obtainment of the perfect shell. The retromitted and retroverted tubular wing, affording an index of a former mouth, and which does not appear to have been accompanied by a reflexion of the peristome, exists in that form in *P. hispidus* only, and the sinus under the wing which crowns the final aperture is never so strongly marked as in the other species, bearing more resemblance to the channel under the wing of GRAY'S *Cyclostoma Petiverianum*, which shell indicates the passage to the Genus *Cyclostoma*, not only by this feature, but by the intermediate form of its umbilical cavity, and its operation.

A comparison of the animal of *Pterocyclos* (my four living specimens of which I assumed to be female, from the absence of the exserted organ so conspicuous on the neck of the male *Cyclostoma)* with that of *Cyclostoma involvulus* shewed only the following differences. In *P. rupestris* the mantle is sinuated, to correspond with the sinus at the crown of the aperture, and its edges are reflected over the edges of the sinus, but there is no organ projected through it by

* In conferring generic names it is an obvious rule that the part should not be put for the whole, by designating the genus from an organ, without a change of termination, or the addition of a distinguishing epithet. The circumstance of the feature being peculiar in the family to which the groupe belongs, will not justify a departure from the rule; were a relaxation from it allowed in one instance, we might be called upon to recognize an anomalous form among the acephalous mollusca (to suppose an extreme case) as the genus "Caput!" In the present instance the effect of the proposed substitution, is to set aside a name published by the first describer of the genus, which name is equally applicable to every species hitherto discovered, as it is not contingent on the presence or absence of a sinus or a tabular, or other perforation, but on the existence of a wing attached to the otherwise circular aperture. Hence the supposed necessity for a change of nomenclature is not apparent.

the animal, nor does the mantle line the interior surface of the wing. No organ likely to occupy the sinus is observable either when the animal is crawling or when it is drawn out to its fullest extent. The foot is shorter in proportion than that of *Cyclostoma*, hardly appearing beyond the disc of the shell when the animal is crawling, and the curious cup-shaped operculum is received into the wide vortici-form umbilicus of the shell, which it almost fills, whereas the thin flat operculum of *C. involvulus* is carried behind the shell.

My living specimens of *Pt. rupestris* were taken at Patharghata* during a morning shower in September. I had in vain searched the ground and bushes among the moist rocks and dripping jungle, where multitudes of *Cyclostoma involvulus*, the reversed *Helix interrupta* and *Nanina vitrinoides* were moving about, and had nearly abandoned the search, when I thought of trying an open tract of the hill whence the jungle had recently been cut. Here, on the exposed side of the hill, as well on the bare surface, as under leaves, I at last discovered the sought-for shell. At the foot of the hill a single specimen of a small conoid *Helix*, which I had recently discovered at Berhampore, was found adhering to the leaves of a shrub.

Pterocyclos hispidus, is perfectly distinguished from *P. rupestris* by its greater size, the flatness of its spire, its sculpture, hispid epidermis, retromitted tube, and the inferior development of the adult mouth. Coming from a climate where it enjoys damp throughout the year, it may possibly use the perforation for a breathing hole when its aperture is closed, but in *P. rupestris* the operculum is drawn in beyond the sinus, so that no such use can be made of it for breathing air, for which, moreover, it has probably little occasion during the season of drought and torpidity.

18. *Pterocyclos parvus*. Spiraculum parvum, Pearson, Journal of the Asiatic Society, vol. ii. p. 592.

This species, which is coloured like one of the varieties of *P. rupestris*, never attains more than half the size of that species. The numerous specimens brought from Silhet have all a perfect, reflected peristome. It is also distinguishable by the greater tendency of the sinus being often in strict contact, though the circle is never completed by

* Besides some other plants in flower which I had not leisure to note, I observed a little blue-flowered *Tradescantia*, a dwarf *Ruellia*, and a beautiful large-flowered *Pesticia* with spikes of flowers of a pale verdigris-green colour, which I had only once before seen ornamenting a corolla in a species of *Ixia (J. maculata ?)* In December 1831, the jungle on the side of Patharghata was flaming with the rich blossoms of *Holmskioldia coccinea*. On Kotanási, a hill between Patharghata and Terriagali, I captured a fine specimen of the splendid *Buprestis Chrysis*.

the confluence of the shelly matter. The impending wing also shews a greater tendency to a retroverted and tabular form.

It is probable that SOWERBY's *Cyclostoma bilabiatum*, from Salem in the Madras presidency, will form a fourth species of *Pterocyclos*, distinguished by the sinuated addition at the back of the true lip. When I examined it in London, I thought that it was identical with *P. rupestris*, and that my specimens of the latter had not attained their full growth; a further search in the locality of the species, and the consideration that the sinuated lip must have been of previous formation to the reflected circular aperture, have contributed to alter my opinion on the subject.

Cyclostoma suturale has the aspect of an immature *Pterocyclos*. Its habitat is, I believe, Demarara.

I had prepared the whole of my notes on the collection both of land and fresh-water shells during a period of leisure previously to the close of last year, but I have since then been prevented by want of time from correcting and arranging them. Dr. PEARSON's hint, in his report on the Museum, has called forth this first brochure, consisting of the land-shells, I fear in rather an unfinished state, for which I trust that circumstances will prove an apology. The fresh-water shells shall follow at the earliest practicable period.

V.—*Description of two new species belonging to a new form of the Meruline Group of Birds, with indication of their generic character. By* B. H. HODGSON, *Esq. Resident in Nèpál*

These birds have the wings, tail, and feet of *Turdus;* and if we continue the comparison from the external to the internal characters, we find a similar construction of the tongue, stomach, and intestines in both.

Both, too, have a similar regimen, habits, and manners. Yet they are strikingly contradistinguished by the respective forms of the bill. In the thrushes that member is compressed, and has its arched maxilla freely exserted from the frontal feathers, and very little cut out by the nasal fossæ. In the birds now in question, on the contrary, the bill is so much depressed as to be more than twice as broad as high at the base; and its straight maxilla, greatly incumbered by the frontal plumes, has the nasal fosse so far produced to the front as to pass the centre of length of the bill.

In the birds before us, too, the head is furnished with a garruline crest; which is never observed in *Turdus*. The tarsi are lower than in the generality of thrushes; and the tail is somewhat longer and less even at the end. Like most of the Nipalese thrushes, these birds are common to all the three regions of the kingdom. They are shy in